Office of National Marine Sanctuaries/National Centers for Coastal Ocean Science Long-term Agreement (ONMS/NCCOS LTA)

2004 Annual Liaison Report on Existing and Potential ONMS/NCCOS Collaborative Studies at the Channel Islands National Marine Sanctuary (CINMS)

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INTRODUCTION

Collaborative studies between the National Centers for Coastal Ocean Science (NCCOS) and the Office of National Marine Sanctuaries (ONMS) are underway in all 14 ONMS sites. An important part of the evolving ONMS/NCCOS collaborations is to determine how best NCCOS skills and expertise can be used to address ONMS site issues. To meet this goal, NCCOS liaisons to the 14 sites are charged with preparing a report to document the status of collaboration at each Site at the beginning of each fiscal year. This report contains information on the research activities and capabilities of NCCOS, current science efforts and needs in sanctuaries, an assessment of overlap between NCCOS capabilities and ONMS needs, identification of areas where greater efficiencies in scientific activities could be made, research gaps, and recommendations for pursuing collaborative efforts on new or existing projects. This report will provide guidance on improving current NCCOS research at each sanctuary site and recommend areas of future collaboration. The goal is to provide a concise, easily digestible report on existing and potential overlap between sanctuary needs and NCCOS capabilities. The following report addresses these considerations for the Channel Islands NMS.

APPROACH

The reports primary content is presented in a simple tabular format to allow easy cross reference between sanctuary needs and NCCOS capabilities. Where sanctuary needs and NCCOS capabilities overlap, this tabular format allows easy identification of existing projects. More importantly, areas where overlap occurs but projects are lacking are identified and noted as topics for potential collaboration. Following the Needs/Capabilities summary table, existing and potential projects are then summarized and contact information provided to foster discussion and proposal opportunities for the next ONMS/NCCOS funding cycle in FY2005. More detailed information on each sanctuary and NCCOS Center is available on the internet and will not be presented here.

Table values were obtained from several documents and through consultation with ONMS and NCCOS staff. Entries under the field, “Sanctuary Science and Management Needs”, were drawn directly from the July 2002 report on Sanctuary Science by Gittings *et al*. In that report, science needs and their corresponding management issues for each sanctuary were tabulated according to relevance and adequacy of current studies. Topics recommended for additional research are focused on in the Gittings et al report and receive similar focus here to emphasize adequacy of current ONMS/NCCOS studies in sanctuaries and identify areas of potential collaboration. Table CI-3 of that report identifies key issues that require additional study at the Channel Islands NMS. These issues were condensed and used as a starting point to identify Sanctuary Science and Management Needs in Table 1 below. This list was then reviewed and supplemented by liaison and sanctuary staff to reflect needs as of FY2004.

Entries under “NCCOS Capabilities” were obtained from the NCCOS website and liaison knowledge of NCCOS. This list includes only relevant NCCOS capabilities that are related to CINMS needs and is not intended to be an exhaustive list of NCCOS expertise. Entries under “Existing Projects” were generated from liaison knowledge and then reviewed by sanctuary staff. While it is recognized that many organizations and academic institutions outside of NCCOS are involved in science activities at each sanctuary site, the focus of this report is on improving ONMS/NCCOS collaborations.

Entries under “Potential Projects” occur where sanctuary needs overlap with NCCOS capabilities but no project exists. Field entries here are generated by liaisons and serve as a flag to alert NCCOS and ONMS staff to “missed opportunities” and encourage future discussions between the relevant NCCOS Center and CINMS staff.

TABLE 1. Channel Islands NMS Needs and NCCOS Capabilities.

Table 1. Channel Islands NMS Needs and NCCOS Capabilities

Sanctuary Science and Management Needs	NCCOS Capabilities	Existing CINMS/NCCOS Projects	Potential CINMS/NCCOS Projects
1. Biological Resources:			
Pertinent information on species of interest, biological communities, and ecological indicators	CCMA: Biogeographic assessments; Spatially-articulated species abundance and distribution estimation. Habitat suitability modeling. CCFHR: Developing an understanding of the biological productivity of estuaries and ocean ecosystems to enhance coastal habitats and living marine resources.	CCMA: Biogeographic Characterization of CINMS	CCMA: Continue as described
2. Event Response			
Impact assessments of spills, groundings, HAB's, etc. at appropriate scales; Current and retrospective risk assessments	CCMA: Ecological forecasting and modeling of changes in species distribution due to environmental perturbation. Habitat Suitability Modeling. HAB mapping, monitoring, and prediction CCFHR: Habitat restoration and habitat recovery modelling. CCEHBR: Characterizing harmful algal blooms, environmental quality, and coastal ecosystem health		Utilize NCCOS capabilities as needed for event response. CCMA: Operational HAB mapping
3. Habitat			
Information on oceanographic and atmospheric processes that create and/or change seabed forms, and predictive models to understand habitat distribution and dynamics	CCFHR: Habitat restoration and habitat recovery modelling.		CCFHR: Initiate habitat restoration and habitat recovery modelling efforts.
3. Harvesting			
Effects of fishing/harvest on predator-prey dynamics, effects of global warming and currents on harvested species; information on factors controlling year class strength of harvested species (demographics and species interactions); data on habitat changes due to fishing practices, and spatially articulated effort data for commercial harvest activities	CCFHR: Fishery species responses to exploitation. CCMA: Habtitat Suitability Modeling, spatially-articulated fisheries models and analyses.	CCMA: Biogeographic Characterization of CINMS (Commercial catch analyses)	CCMA: Continue as described CCEHBR: Genetic characterization of fish and shellfish
4. Industrial Uses			
Vessel traffic characterizations (patterns, balast exchange, and accoustic signatures), tourism profiles, and identification of sources of invasive species.	NCCOS: Alien species early detection and warning system, member of the Aquatic Nuisance Species Task Force		NCCOS: Implement alien species early detection and warning system, member of the Aquatic Nuisance Species Task Force
5. Mapping Capabilities			
GIS compatible data: Shoreline	CCMA: Remote sensing and mapping capability using satellite and aerial photo techniques.		CCMA: Remote sensing for oceanographic characterization.
7. Restoration			
Valuation of sanctuary resources	CCFHR: Damage and recovery models for seagrass communities. CCEHBR: habitat restoration research at the Oxford Cooperative Lab.		Valuation studies are currently ongoing through NOAA's Coastal and Ocean Resource Economics (CORE) Program
8. Water Quality			
Information on incident vessel contamination, temporal changes in pathogens, organics, and metals.	CCMA: Sediment contaminant studies, National Status and Trends Program. CCEHBR: Chemical contaminants studies and environmental quality. Marine toxins and Harmful Algal Blooms HML: Ecotoxicology and environmental chemistry expertise.		CCMA: Chlorophyll and turbidity monitoring
9. Wildlife Disturbance			
Response of species to disturbance, spatio-temporal patterns of disturbance, verification of cause and effect, threat indentification and response prediction.	CCMA: Ecological forecasting and modeling of changes in species distribution due to environmental perturbation. Habitat Suitability Modeling.		CCMA/CCFHR: Model (forecast) changes in species distribution due to environmental perturbation as needed. Habitat Suitability Modeling.
10. Zone Performance			
Effectiveness of alternative zoning regimes.	CCMA: Biogeographic Characterization	CCMA: Biogeographic Characterization	CCMA: continue ongoing activity

SUMMARY OF EXISTING CINMS/NCCOS STUDIES

CCMA is collaborating with the Office of National Marine Sanctuaries (ONMS) and Channel Islands National Marine Sanctuary (CINMS) personnel to conduct a biogeographic assessment of the marine region surrounding the Channel Islands National Marine Sanctuary. This assessment is being conducted, in part, to support CINMS Management plan revisions. The intent of this work is to assimilate and analyze relevant and comprehensive spatial data to evaluate potential implications of six boundary alternatives currently under consideration by NOAA's ONMS. In addition, results of this assessment will be used to suggest additional alternatives that maximize benefit to living resources in the study area. Anticipated products and activities of this assessment will include: 1) a biogeographic analysis and development of a marine geographic information system (GIS) for the area; and 2) a robust quantitative ecological "cost-benefit" analysis of boundary alternatives for resources in the study area (birds, mammals, fish, invertebrates, and habitats critical to those groups. This spatially-articulated characterization of the Channel Islands ecosystem and surrounding area extends in the north from Morro Bay to 30 kilometers south of Santa Catalina Island. Modeling, data integration, and a quantitative assessment of biotic and habitat resources will be produced for each boundary alternative

SUMMARY OF POTENTIAL CINMS/NCCOS STUDIES

Sanctuary Management Endpoint #1: Biological Resources

NCCOS is currently engaged in developing information on biological resources in the sanctuary. This robust biogeographic assessment is due to be completed early 2005.

Sanctuary Management Endpoint #2: Event Response

A variety of NCCOS capabilities could be utilized depending on the specific nature of the event. For example, operationalizing HAB mapping activities for the Central California Bight would provide valuable data to monitor and ultimately predict the extent and magnitude of a HAB event. Such information would be critical to developing a response strategy for the sanctuary.

Sanctuary Management Endpoint #3: Habitat

Research on various aspects of seagrass ecology has been ongoing at NCCOS's CCFHR for 20 years. Areas of investigation have included development and dissemination of planting, monitoring protocols, and success criteria, as well as studies to determine the light requirements of seagrasses, functional equivalency of restored beds as compared to natural, undisturbed systems, and landscape scale studies regarding the temporal dynamics of seagrass bed pattern and distribution. Emphasis has been placed on research information transfer to managers, active participation in research projects, and litigation. The research approach has been to sustain a broad-based program covering a variety of ecological processes which allows the scientists to quickly adapt and respond to changing management concerns and issues. This robust knowledge base could be expanded to develop similar techniques for understanding seagrass and kelp dynamics in the CINMS.

Sanctuary Management Endpoint #4: Harvesting
NCCOS is currently engaged in developing information on biological resources, including harvested fishery species, in the sanctuary. This robust biogeographic assessment is due to be completed early 2005.

Sanctuary Management Endpoint #5: Industrial Uses
NCCOS scientists conduct research on both plant and animal invasive species. Working with other research partners, NCCOS is developing a pilot early warning system that will indicate the early presence of invasive species in Hawaii's marine and estuarine coastal areas. The system will include a searchable database of native coastal species and will be available on the Internet. Future projects will expand the database to include other coastal states, territories, and U.S. possessions, thus building a national early warning system. And as a member of the Aquatic Nuisance Species Task Force, NCCOS studies developing technologies that may help reduce the impact of invasive species resulting from contaminated ballast water.

Implementing NCCOS's early warning system in and around the CINMS would be made far easier following CCMA's biogeographic characterization of the region. As part of the biogeographic characterization, CCMA scientists are developing a historical inventory of species caught commercially, recreationally, and in fisheries-independent monitoring activities. Furthermore CCMA will be working with local academic experts in developing this list. Such an inventory would seem to be critical to developing an early warning system for invasive species.

Sanctuary Management Endpoint #6: Mapping Capabilities
CCMA's Remote Sensing Team has extensive expertise in the area of ocean surface characterization using a variety of satellite data sources. Oceanographic characterization of the CINMS area could include sea surface temperature for current mapping and color mapping for chlorophyll and productivity measurement.

Sanctuary Management Endpoint #7: Restoration
None. Valuation studies are currently ongoing through NOAA's Coastal and Ocean Resource Economics (CORE) Program.

Sanctuary Management Endpoint #8: Water Quality
CCMA currently has the capability to monitor chlorophyll, turbidity, sea surface temperature, and other parameters using remotely sensed data (see #6 above). As stated in #2 above, a product and data stream between CCMA and CINMS could be operationalized to provide timely information critical to resource management.

Sanctuary Management Endpoint #9: Wildlife Disturbance
Both CCMA and CCFHR have the skills necessary to develop various types of spatially articulated models of resource abundance and distribution. Capabilities range from

relatively simple deterministic to geostatistical models. CCMA's biogeographic assessment is laying a foundation for this type of work (including the development of potential resource distribution through deterministic modeling), and could easily extend current efforts to include development of robust models to estimate distributional changes in response to disturbance(s).

Sanctuary Management Endpoint #10: Zone Performance
Continue ongoing CCMA activities as described above.

CONTACTS

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